

### **CLAIM AMENDMENTS**

1. (Previously presented) A semiconductor structure comprising: a substrate and a  $\text{Sn}_x\text{Ge}_{1-x}$  layer formed directly on the substrate, wherein x has a value from about 0.02 to about 0.20, and wherein the substrate consists essentially of silicon.
2. (Original) The semiconductor structure of claim 1 wherein the  $\text{Sn}_x\text{Ge}_{1-x}$  layer is an epitaxial layer with a direct band gap between about 0.72eV and about .041eV.
3. (Original) The semiconductor structure of claim 1, wherein x has a value of about 0.20 and the  $\text{Sn}_x\text{Ge}_{1-x}$  layer is a direct-gap material.
4. (Cancelled)
5. (Currently Amended) The semiconductor structure of claim **1** [[4]] wherein the substrate consists essentially of Si(100).
6. (Currently Amended) The semiconductor structure of claim **1** [[4]] wherein the substrate consists essentially of Si(111).
- 7-9. (Cancelled)
10. (Original) The semiconductor structure of claim 1 wherein the  $\text{Sn}_x\text{Ge}_{1-x}$  layer has a thickness of about 50nm to about 1000nm.
11. (Original) The semiconductor structure of claim 1 further comprising a strained Ge layer formed over the  $\text{Sn}_x\text{Ge}_{1-x}$  layer.
12. (Original) The semiconductor structure of claim 11 wherein x is greater than about 0.11 and the strained Ge layer is a direct-gap material.

13. (Currently amended) A semiconductor structure comprising: ~~a discontinuous Ge-Sn quantum structure~~ islands dispersed ~~formed~~ over a silicon substrate.

14. (Original) The semiconductor structure of claim 13 wherein the Ge-Sn quantum structure comprises  $\text{Ge}_{1-x}\text{Sn}_x$  and x has value from about 0.02 to about 0.03.

15. (Original) The semiconductor structure of claim 13 wherein the Ge-Sn quantum structure is formed over Ge-Sn epitaxial layer formed over the silicon substrate.

16. (Original) The semiconductor structure of claim 13 wherein the substrate comprises Si(100).

17. (Original) A method for depositing an epitaxial Ge-Sn layer on a substrate in a chemical vapor deposition reaction chamber, the method comprising introducing into the chamber a gaseous precursor comprising  $\text{SnD}_4$  under conditions whereby the epitaxial Ge-Sn layer is formed on the substrate.

18. (Original) The method of claim 17 wherein the gaseous precursor comprises  $\text{SnD}_4$  and high purity  $\text{H}_2$ .

19. (Previously presented) The method of claim 17 wherein the gaseous precursor further comprises high purity  $\text{H}_2$  of about 15-20 by volume.

20. (Original) The method of claim 17 wherein the gaseous precursor is introduced at a temperature in a range of about 250°C to about 350°C.

21. (Original) The method of claim 17 wherein the substrate comprises silicon.

22. (Original) The method of claim 17 wherein the substrate comprises Si(100).

23. (Original) The method of claim 17 wherein the Ge-Sn layer comprises  $\text{Sn}_x\text{Ge}_{1-x}$  and  $x$  is in a range from about .02 to about .20.
24. (Original) A method for depositing a strained Ge layer on a silicon substrate with a Ge-Sn buffer layer in a chemical vapor deposition reaction chamber, the method comprising introducing into the chamber a combination comprising  $\text{SnD}_4$  and  $\text{Ge}_2\text{H}_6$  under conditions whereby the Ge-Sn layer is formed on the substrate and dehydrogenating  $\text{Ge}_2\text{H}_6$  under conditions whereby the Ge layer is formed on the Ge-Sn buffer layer.
25. (Previously presented) The semiconductor structure of claim 1, wherein the  $\text{Sn}_x\text{Ge}_{1-x}$  layer is relaxed.
26. (Previously presented) The semiconductor structure of claim 1, wherein the  $\text{Sn}_x\text{Ge}_{1-x}$  layer is epitaxial.
27. (Previously presented) The semiconductor structure of claim 26, wherein the substrate is accommodated by Lomer edge dislocations.
28. (Previously presented) The semiconductor structure of claim 1, wherein the  $\text{Sn}_x\text{Ge}_{1-x}$  layer lattice parameters are about 5.672 Å to about 5.833 Å.
29. (Previously presented) The method of claim 17 wherein the gaseous precursor comprises  $\text{SnD}_4$  and  $\text{Ge}_2\text{H}_6$ .
30. (Previously presented) The semiconductor structure of claim 1, wherein the  $\text{Sn}_x\text{Ge}_{1-x}$  layer is atomically flat.